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The Editor's Page

Our Abstract Services. Are You Using Them?

THE contents of this issue emphasize one of the important services to the domestic textile industry for which U. S. Institute for Textile Research was organized, and which has been a feature of this magazine from its inception. We refer to the abstract section of the latter and its special services to members of the Institute.

"To promote, cultivate and facilitate scientific research" in the textile industry the founders of the Institute envisioned the need of a central library of textile research, and a regular review of important new research and technical developments throughout the world. The latter was inaugurated in mimeograph form in 1931, and since 1932 as this publication, the latter having been made possible by the co-operation of The Textile Foundation. The files of TEXTILE RESEARCH and its mimeographed predecessor form a very complete research and technical reference library for this period. It falls far short of the ideals of Institute founders in its lack of complete published articles and books, but it is doubtful if any library, excepting possibly that of the Textile Institute in England and the Library of Congress, maintains a more complete index and cross-index of textile research and technical matter published throughout the world during the last six years.

In the last volume of TEXTILE RESEARCH, and in addition to the many complete reports of original research of Textile Foundation Fellows and others, there were published 698 abstracts of articles on important research and technical developments culled from over 100 publications throughout the world. The current volume will contain a much larger number. They are indexed and cross-indexed for ready reference in Institute files, and an index supplement is published with each volume.

Few mills have personnel qualified to conduct the abstracting of such a wide variety of subjects, and, few care to provide the

time of reviewing and the expense of subscribing to the large number of publications that are abstracted by the Institute's Commitee on Abstracts and Bibliography. Even for the Committee it would be too great a task did they not take advantage with due credit of the abstracts published by *Chemical Abstracts*, the *Journal of the Textile Institute* and others specializing in this work.

Your Commitee realizes that while its coverage by subject and author is exceptionally complete, its abstracting of some reports of important research results and technical developments is less informative than it should be. Until more space for this section can be afforded by the Institute this will remain a regrettable defect, and the same factor may sometimes delay as prompt publication as could be desired.

The Abstract Section of the current issue, plus the publication almost complete of an article from *The Textile Manufacturer* discussing what appears to be an important discovery for rendering wool products unshrinkable, approach more closely than usual to the desired ideal, and should serve to emphasize to Institute members the importance and value of the service itself and the services that are available in this connection. The latter are briefly described on the first Abstract page. The increased number of orders received for complete photostat copies of articles abstracted, and of inquiries for addresses of publications in which the abstracted articles appeared, reflect gratifying appreciation and use of this section and service.

* * *

Summer Course in Textile Research

A six-weeks' summer course on the Principles of Textile Analysis is offered by Massachusetts Institute of Technology, Cambridge, Mass., beginning July 26, under the direction of Prof. E. R. Schwarz. The program includes lectures, demonstrations illustrated by experiments, lantern slides, and moving pictures, together with laboratory exercises in physical analysis of textiles, textile microscopy, and principles of fabric structure. It is offered for the benefit of laboratory technicians, teachers of household economics, students from textile schools, and others interested in textile research. Tuition including the $5.00 registration fee is $100. As the laboratory group will be limited in size, early registration is desirable.

Seminar for Teachers of Textile Economics

UNDER the sponsorship of the Textile Foundation a seminar on textile economics was conducted in New York City, starting June 14 and continuing for 12 days, with headquarters at the Hotel Commodore. Text material on various phases of textile economics was recently completed by the staff of the Wharton School of Finance and Commerce, University of Pennsylvania, for the Textile Foundation, and the seminar was designed to give the teachers of this subject in textile schools an opportunity to become more thoroughly familiar with the structure and operation of the textile industry and its merchandising.

In addition to the lectures there were visits to the New York Cotton Exchange, to a number of selling houses, to the various textile associations having headquarters in New York City, to a number of mills in New Jersey, including Botany Worsted Mills and the laboratories of the U. S. Testing Co.; the party also visited the Textile High School of the City of New York, the Better Fabrics Testing Bureau and the Metropolitan Museum of Art.

* * *

Training for Cellulose Research

IN co-operation with the Chemical Foundation, the Massachusetts Institute of Technology will increase the facilities and staff for fundamental research and the training of research workers in the physical and chemical properties of cellulose. Technical direction of the cellulose laboratory has been entrusted to Prof. Clifford B. Purves of the Department of Chemistry. Associated with him will be Dr. F. B. Cramer of Princeton University and Dr. H. Grangaard of Ohio State University, who have been appointed research associates. The new development will be supervised by Prof. F. G. Keyes, head of the Department of Chemistry and Prof. J. F. Norris, director of the Research Laboratory of Organic Chemistry. Beginning with the Fall term a graduate course of lectures on the chemistry of cellulose and related subjects will be given by Prof. Purves. A limited number of fellowships in cellulose chemistry and a limited number of teaching fellowships in the cellulose laboratory will be established, and allotted to suitable candidates who wish to undertake research in this field.

* * *

Textile Drying Research Booklet

AN outline of the purposes, program, organization, administration and financing of the co-operative study of textile drying under the auspices of U. S. Institute for Textile Research at the National Bureau of Standards has been published in a 16-page booklet. It explains how the progress reports and other services of the study may be obtained, and also contains a description of the Institute's co-operative research plan. Copies may be obtained by addressing the Secretary's office.

Unshrinkable Wool Process

A new process for making wool unshrinkable without damage makes use of a solution of sulphuryl chloride in white spirit or similar inert organic solvent. It was made public by Mr. A. J. Hall in a recent lecture before the Manchester (Eng.) Section of the Society of Dyers and Colourists. It is explained and discussed in the April issue of The Textile Manufacturer *by a Special Correspondent as follows:*

"That wool can be made completely unshrinkable without damage by means of a solution of sulphuryl chloride in white spirit or similar inert organic solvent, and that this discovery has been developed into a successful process applicable to wool in almost any form from the sheep's back to fully manufactured garments was announced by a recent lecture by Mr. A. J. Hall, B.Sc., F.I.C., F.T.I., before the Manchester (Eng.) Section of The Society of Dyers and Colourists. According to Mr. Hall, a semi-large scale demonstration plant is now at work at Messrs. Adams and Co. of Nottingham, and the process which is the subject of patent applications in most countries is being licensed to all sections of the wool industry. A number of well-known firms have been granted licences and it is expected that wool materials processed by this new method will be available to the public in two or three months time when the new plants now being erected will be in work.

"Briefly described the process consists of steeping the wool material for about one hour at room temperature in a 1½% to 2% (calculated by volume) of sulphuryl chloride in white spirit (or, if preferred, trichloroethylene or other inert solvent). This is followed by hydroextraction and washing with water. Afterwards the wool, which is now unshrinkable, is thoroughly neutralized in a warm dilute alkaline solution (ammonia, soda ash, or sodium bicarbonate are suitable alkalis), again washed and then dried.

"The solution which flows out of the hydroextractor is collected for re-use, the loss of solvent being not more than 1½ gals. per 100 lb. of wool. In the treatment the solution is reduced to about one-half of its original concentration of sulphuryl chloride and it is a simple matter to add a suitable amount of fresh reagent ready for applying to another quantity of wool.

"Sulphuryl chloride is a heavy water-white liquid which is formed by chemical combination of sulphur dioxide with chlorine preferably aided by the presence of camphor as catalyst. It is freely soluble in several organic solvents among which is the white spirit (a petroleum fraction) used in the new unshrinkable finish. Sulphuryl chloride does not mix with water but sinks to the bottom and there slowly hydrolyzes with formation of hydrochloric and sulphuric acids as indicated in the following equation:

$$\begin{matrix} \text{Cl} \\ \text{Cl} \end{matrix}\!\!>\!\text{SO}_2 + 2\text{H}_2\text{O} = \begin{matrix} \text{HO} \\ \text{HO} \end{matrix}\!\!>\!\text{SO}_2 + 2\text{HCl}$$

Sulphuryl chloride	Water	Sulphuric acid	Hydrochloric acid

It is because of this hydrolysis that the liquid fumes somewhat when exposed to the damp air.

"The use of sulphuryl chloride for making wool unshrinkable appears to be about the only application of this substance to textile treatment and any possibility that it could be used for this purpose appears to have been completely overlooked or indeed has not been hitherto suspected.

"In the course of his lecture Mr. Hall reviewed the effect of the new treatment on the wool itself, and where possible indicated the corresponding effect of chlorination (a treatment which is practically the only other means known for making wool unshrinkable).

"In appearance, each wool fibre is inappreciably affected. It is not changed in length or diameter, and the epithelial scales are left intact. This latter feature is of considerable importance. It is generally recognized that the scales act as a protective sheath to each fibre, and if the sulphuryl chloride treatment leaves these intact it is most probable that the wool will retain its normal durability.

Effect of Chlorination on Wool

"Recently R. Haller (*Textilber.*, 1937, *18*, 5) has carried out some very interesting work on the separation of the scales from the cortex and been able to show that there is a distinct difference in properties between these two components of a wool fibre. Haller discovered that when wool is steeped for one or two months in a saturated solution of ammonia the wool fibres disintegrate to form a 'mush' of epithelial scales and spindle cells (these constitute the cortex). The scales appear to be made of a tougher type of keratin than the cortex and they have no affinity for most acid dyes, whereas the spindle cells readily absorb dyes.

"It is evident that in dyeing processes the scales tend to prevent entry of the dye particles as indeed these same scales prevent the harmful effect of other influences reaching the cortex. But after making wool unshrinkable by means of chlorine it is found that the wool readily dyes much deeper than untreated wool. It is easy to understand this. The chlorination either removes a proportion of the scales or it thins or otherwise affects them that dye particles pass by them more easily into the cortex. To a large extent it is possible to estimate the damage thus caused to wool by chlorination by the increased dyeing affinity of the treated wool.

"Mr. Hall stated that wool made unshrinkable by the sulphuryl chloride process does not acquire a substantially deeper colour in dyeing than the untreated wool. This implies that the wool is not appreciably damaged. It is claimed that when wool fabrics are brought to the same degree of unshrinkability by sulphuryl chloride and chlorine processes the chlorinated wool dyes very much deeper than that treated with sulphuryl chloride. This fact, taken in conjunction with microscopical examination of the wool fibres from both fabrics, indicates that chlorination produces five to ten times as much damage to the wool as does sulphuryl chloride. Expressed otherwise, this means that wool fabrics and yarns made unshrinkable by the new process should have a much greater durability.

"The alkali-solubility of unshrinkable wool has been considered by M. Harris and A. Smith (*Am. Dyestuff Rptr.*, 1936, *25*, 542) with particular reference to its use as a means of assessing the damage caused to wool by various treatments. These workers consider that the alkali-solubility of

a wool fabric is a reasonable measure of its loss of durability as produced by a chlorine unshrinkable finish and their results (shown in Fig. 1) obtained with a carpet yarn (curve A indicates the rise of alkali-solubility with increase of severity of chlorination; curve B shows the 'wear index' determined on the same treated yarns with the aid of a carpet wear-testing machine) confirm this view. It is interesting to notice therefore that Mr. Hall quoted low alkali-solubility results obtained with wool made unshrinkable with the new process. Actually the following results were given:

Treatment	Alkali-Solubility
Untreated wool fabric	5.8%
Treated with 3% chlorine	11.9%
4½%	13.7%
6%	15.7%
7½%	15.8%
Treated with 1½% sulphuryl chloride	8.3%
1¾%	8.6%
2%	8.5%
2¼%	8.8%

"When the above fabrics were compared as regards their shrinkage in washing it was found that the same resistance to shrinkage was obtained in the case of fabrics treated with 4½% chlorine and 2¼% sulphuryl chloride respectively. It is thus obvious that the increased solubility produced by chlorination (13.7 — 5.8 = 7.9) is about 2½ times that (8.8 — 5.8 = 3.0) produced by sulphuryl chloride treatment.

Quality of Results

"This different effect of the chlorination and sulphuryl chloride treatments on wool is further illustrated by the different appearances of the wool fabric after treatment. Most wool finishers find it necessary to mill the fabric before making it unshrinkable; this milling is for the purpose of giving the fabric that degree of 'body' which is generally desired in a vest or other wool garment. But the chlorination unshrinkable treatment has the effect of thinning the fabric by removing loosely projecting fibres, and thus it is usually necessary to give the fabric more 'mill' than is actually required in the finished material. After the chlorination the fabric will then have the desired effect but less amount of 'mill.' In the case of a sulphuryl chloride treatment the fabric does not lose its 'mill.' On this account it is not required to mill strongly before the unshrinkable treatment.

"While the fact that the sulphuryl chloride process does not thin the fabric or remove the 'mill' is support for the view that this process does not damage wool so much as the chlorination treatment, it has another effect —it does not make the wool material so lustrous. Actually the process can be adapted to make wool lustrous, but this is not necessary to the unshrinkable finish. In chlorination, an increase of lustre is a sign of impoverishment of the wool and, in fact, the more damaged is the wool the higher is its lustre.

"Milling of a wool fabric reduces its lustre because the surface thereby becomes obscured by a thin film of closely interlocking wool fibres arranged quite higgledy-piggledy. High lustre is favoured by arrangement of the

wool fibres parallel to each other. When the milled fabric is chlorinated as in the usual unshrinkable finish this film of loosely arranged surface fibres is removed and the fabric thus becomes more lustrous. On the other hand, when the unshrinkable finish is produced by treatment with sulphuryl chloride, the surface fibres are not removed and the fabric does not gain in lustre. It is obvious that when lustre increase is desired pre-milling should be avoided or at least reduced.

"This absence of loss of 'mill' in treating wool with sulphuryl chloride to make it unshrinkable is of further importance in connection with both yarn and fabric. The usual chlorine process tends to make yarn thinner and poorer in handle in much the same manner as it thins a fabric. Wool yarn made unshrinkable by means of sulphuryl chloride retains its full handle and is thus more valuable for knitting up into garments and fabrics. For much the same reason yarns and fabrics lose less weight by the sulphuryl chloride method and this must be considered a distinct advantage when it is remembered that wool is now an expensive fibre.

"Turning once more to the treatment itself Mr. Hall pointed out that the method ensures uniform and thorough penetration of wool materials because it is obviously much easier for an organic solvent such as white spirit to penetrate a yarn or fabric than it is for water to do so. This rapid and thorough penetration of the wool material so that every individual fibre receives its fair share of treatment is an important feature of the process. Coupled with this is the fact that during the treatment the sulphuryl chloride reacts comparatively slowly on the wool; this is evident from the observation that at the end of the treatment only about one-half of the sulphuryl chloride has reacted. This again makes for evenness of treatment. Corresponding with this is the recognized fact that a chlorine liquor reacts rapidly with wool so that about 90% of the chlorine is absorbed within a few minutes.

"According to Mr. Hall the treatment can be carried out under various conditions, but in general it is preferred to work at ordinary temperature and with wool materials in the air dry condition. It is possible to work with wet wool but there are no advantages in doing this. For example, white spirit penetrates a dry material much more rapidly and more evenly than a wet one. On the other hand, there is no necessity to dry the wool goods to any special degree of dryness; the goods are quite suitable as they leave the knitting or other machine, and also as left lying about in the works for some time.

"Apparently cotton and viscose rayon materials are not harmed by the treatment but there is one proviso. The cotton or rayon should not be too damp; but if left lying about in a fairly dry room for a few hours they are quite satisfactory. The new unshrinkable treatment can thus be applied to mixture materials containing wool together with cotton or rayon. No information was given as to the effect of the treatment on linen, but presumably there would be no difficulty about this fibre.

"It will be remembered that the process is called a non-chlorine treatment, and this is strictly correct for no active chlorine can be detected during the processing. This has at least two advantages. Firstly it avoids any oxidation of the wool, and secondly it reduces any adverse effect which the process may have on coloured materials whether they be of cotton or wool. The process must be regarded as essentially an acid treatment, and it is thus easy to account for the observed fact that very few wool dyes

are affected while many direct cotton dyes also retain their colour. In the chlorine unshrinkable process cotton colours are generally much affected (in many instances they are discharged to white) for the treatment is practically equivalent to a chemic bleach. But in the new process the coloured cotton is mainly in contact with hydrochloric and sulphuric acids and if the dye will withstand these it will be fast during the sulphuryl chloride unshrinkable treatment.

"In reviewing the possible influence which the new process could have on the wool industry Mr. Hall suggested that it might well have the effect of causing much more wool to be passed through an unshrinkable process than hitherto. It was possible to treat the wool at any stage in its manufacturing history, and wool had actually been taken straight from the sheep's back and treated; subsequently it had been scoured, spun into yarn, and manufactured into unshrinkable fabric. But it was also believed that the process would make more practicable the treatment of loose scoured wool, and wool in the form of tops so that this could then be spun into unshrinkable yarn. In treating tops, it would be possible to treat them in 'ball form' for the white spirit would readily penetrate through the greasy scoured wool.

"For treating yarn the process was especially suitable and in large scale trials the resulting wool was found to have an excellent handle. Obviously there is a wide field awaiting exploitation—the preparation of unshrinkable dyed wool yarns capable of being knitted up into underwear which requires no wet processing to make it unshrinkable. Wool garment and fabrics also lend themselves excellently to the new process and mainly owing to the fact that every fibre in the material can be made unshrinkable."

Science and Empiricism

Cellulose acetate yarns 15% stronger than those made from cotton linters and 45% stronger than those made from wood pulp is claimed for those made with an alpha-cellulose produced from "Musa," a hemp fibre. The report is from a foreign source via *Rayon Textile Monthly.*

"Bean-Rayon" is to be manufactured from the stems of the soya bean by a Japanese company, capitalized at 12,000,000 yen, according to a report from Tokyo. Possibly the same company will also produce "bean-wool" from vegetable casein extracted from the soya bean.

Mulberry-tree bark as a source of alpha-cellulose for rayon manufacture is the subject of a Japanese process patent. The resultant pulp is claimed to be much cheaper than wood pulp and with a larger alpha-cellulose content. If the mulberry tree loses its bark, wherewith shall the silk-worm be fed?

Bitumen-coated cotton cloth is being used successfully as a roofing material in Egypt, also as a wall covering and for reinforcing roads. As roofs of buildings in Asia and northern Africa are usually flat, and as modern housing in this country shows a similar trend, a new use for cotton worth cultivating is indicated.

Abstracts

Committee on Abstracts and Bibliography:
E. R. Schwarz, Chm., M. W. Weiss, Dr. I. J. Saxl, C. H. Clark.

Members of U. S. Institute for Textile Research desiring complete copies of articles abstracted may avail themselves of any or all of the following services by addressing the Secretary:

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Address C. H. Clark, Sec., 65 Franklin St., Boston, Mass.

I. Fibres (Synthetic and Natural) and Fibre Analysis

Cotton Hair: X-ray Investigation During Growth. K. Hess, C. Trogus and W. Wergin. *Planta*, 1936, V. 25, P. 419–37 (through *Bot. Zbl.*, 1936, V. 170, P. 177–8).

With the aid of X-ray methods, two easily distinguishable crystalline constituents can be detected in growing cotton hairs. The one is only present during cell elongation, and is called the primary substance. The other first appears after completion of elongation, that is, at the beginning of the secondary thickening of the cell-wall. This is the crystalline form of cellulose, which is confirmed by micro-chemical and optical data. The conclusion is drawn that crystalline cellulose is not present during the lengthening phase; amorphous cellulose may be present. (From *J. T. I.*, Jan. 1937, P. A35.) (C)

Cotton: Variability of Fibre Length in a Relatively Uniform Strain of. T. R. Richmond and H. J. Fulton. *J. Agr. Rsch.*, Nov. 15, 1936, P. 749–63; *Cotton Literature*, Feb. 1937, P. 69.

Describes the methods used in determining the variability of length and gives the results of fibre-length studies of a strain of Pima cotton. (C)

Fibre Structures: On the Intensity Distribution on Debye Rings Due to Various. C. Matano. *J. Soc. Chem. Ind. Japan*, Dec. 1936, P. 478–83B; *Cotton Literature*, Feb. 1937, P. 69.

I. General theory; II. Spiral fibre structures of cellulose and fibroin fibres. (C)

GREASY WOOL: COMPONENTS OF. L. Miller. *Studies of the Polish Inst. for Wool Res.*, 1936, No. 5, 40 pp. (English summary); *J. T. I.*, Jan. 1937, P. A1. (C)

HEMP AND HARD FIBRES. VI, VII. Sisal. S. A. G. Caldwell. *Tex. Mfr.*, 1937, Feb., P. 49; Mar., P. 91. (C)

KEMP: INCIDENCE OF—IN THE FLEECE OF SCOTTISH MOUNTAIN BLACKFACE SHEEP, WITH SPECIAL REFERENCE TO INHERITANCE. D. M. Bryant. *Empire J. Exp. Agric.*, 1936, V. 4, P. 165–85; *J. T. I.*, Oct. 1936, P. A450.

Data show that the presence of kemp fibres in the Scottish Mountain Blackface is inherited, the type being Intermediate Inheritance depending upon a multifactor basis. The lower degrees of kempiness tend to show as partial or incomplete dominants over the higher degrees. Kempiness could be reduced therefore by using homozygous non-kempy rams and strict culling of kempy progeny. (C)

LANITAL: CASEIN TEXTILE MATERIAL. E. Wagner and P. A. Koch. *Klepzig's Tex. Z.*, 1936, V. 39, P. 618–21; *J. T. I.*, Jan. 1937, P. A6.

The general conclusions are that lanital is inferior in its mechanical and technical characteristics to the German rayon staple fibre, and that most albumens, as a result of their high water-absorptive capacity, lack the water-resistance necessary for textile fibres. (C)

MINERAL OIL AS A LUBRICANT FOR WOOL. I–VI. L. L. Lloyd. *Wool Rec.*, 1936, V. 50, P. 985–7, 1049–51, 1109–11, 1199–1201, 1261–3, 1323–5; *J. T. I.*, Jan. 1937, P. A9. (C)

MECHANICAL PROPERTIES OF NATURAL AND MERCERIZED CELLULOSIC FIBRES. V. Bossuyt. *Bull. Soc. Chim.*, 1936, V. 5, No. 3, P. 1975–82.

Extension curves and cycles of natural and mercerized ramie fibres in moist air, water, formamide, caustic soda, and lithium thiocyanate solutions have been prepared, as well as extension cycles of linen, hemp and cotton in moist air. The extension curve of natural ramie is particularly modified when combination has occurred between the cellulose and the medium in which it is examined. These modifications are even more marked for mercerized fibres, and appear in every diagram, irrespective of the medium. Adaptation of the extension cycle of a natural fibre increases with its initial crystalline orientation, and this mechanical test can be used to distinguish between ramie, hemp, linen and cotton fibres. (From *J. Soc. Dyers Col.*, Feb. 1937, P. 75.) (C)

MICROSCOPY OF GOAT HAIR. Josef Plail. *Mell. Textilber.*, 1937, No. 3, P. 197. (C)

MICRO DRY DISTILLATION AND ITS USE FOR RECOGNITION OF LANITAL FIBRES. Artur Kutzelnigg. *Mell. Textilber.*, 1937, No. 3, P. 201.

In 1913 Prof. Ernst Beutel examined for the first time the morphology of a number of textile fibres by means of dry distillation and showed

that fibres that are heated between two cover glasses exhibit characteristic appearances which make it possible to differentiate between animal and vegetable fibres, between wool and silk, and between weighted and unweighted silk, even when only traces of the fibres are present. The author has applied that process to the Italian Lanital fibre and shows by means of a large number of photomicrographs that Lanital fibres give rise to characteristic funnel-shaped bubbles when subjected to micro dry distillation. (C)

MOHAIR: MICROGRAPHY, CLASSIFICATION AND LUSTRE. J. Dantzer and O Roehrich. *L'Ind. Text.*, 1936, V. 53, P. 6–7, 60–2, 111–2.

Details are given of the length, fineness and lustre (measured on the Toussaint photo-colorimeter) of the different types of Turkey and Cape mohair. The differences between mohair and wool are shown by means of photomicrographs, and an approximate method is described for distinguishing the two fibres in the case of a blend. A classification (based on the gravimetric method) is suggested for grading the fineness of mohair tops. This also permits the distinguishing of Turkey and Cape mohair as regards lustre and length of fibre. (From *J. T. I.*, Oct. 1936, P. A449. (C)

NATURAL AND SYNTHETIC TEXTILE FIBRES: NEW RESEARCHES UPON ACETATE STAPLE FIBRE AND THE HEAT-CONDUCTING PROPERTIES OF. H. Lohmann and P. Braun. *Mell. Textilber.*, 1937, No. 3, P. 202; No. 4, P. 280.

The authors describe a process for measuring the heat-conductivity of textile fibres which can be applied to wool, cotton, and various types of staple fibre. The results show that the heat protecting effect of Rhodia staple fibre most closely approximates that of wool, while the effect of staple fibre prepared from regenerated cellulose is rather lower. For that reason also, acetate staple fibre is especially suited for admixture with wool. (C)

NIGERIAN COTTON: IMMATURITY. J. K. Mayo. *Bull. Agric. Dept., Nigeria*, 1936, No. 11, P. 31–8; *J. T. I.*, Dec. 1936, P. A589.

Complaints having been received about the neppiness of "Allen" cotton, an examination of the cotton seed was undertaken in 1927. The presence of immature seeds, seeds apparently unfertilized with only a short growth of dead cotton, and a proportion of immature cotton in the bulk of normal seeds, was observed. The cause for this is to be sought in climate and variety. The conclusion was drawn that immaturity was not caused by dry conditions in November and December. Consideration of the climate, and of the varieties which yield well in this district, leads to the conclusion that any cotton which yields as well or better than "Allen" will always be liable to produce immature lint. Any strain giving a lower yield must command a premium for quality large enough to compensate for loss of yield. (C)

II. Yarns and Fabrics

Acetate-rayon Crêpes. E. Gansel. *Canadian Tex. J.*, April 16, 1937, P. 35–7, 54–6.

Preparation of grey cloth for boil-off, modern equipment for crêping and scouring, efficient dyeing and finishing. (C)

Carbonizing of Wool. E. Elöd and G. Haas. *Klepzig's Textil-Z.*, 1937, V. 40, P. 31–5; abs. in *C. A.*, 1937, V. 31, Col. 2013.

The optimal conditions were sought under which the desired carbonization of the vegetable and cellulose-contg. constituents could be brought about and the properties of the wool preserved. Two types of wool damage may be produced by carbonization: (1) protein decompn. and (2) defects caused by improper plant control. The acid damage of wool is not limited to the decompn. reactions of the wool proper but extends to the swelling relationships; thus the velocity of dye absorption was found to depend on the extent of the damage. Conditions were then chosen under which these differences became particularly noticeable. . . . The results showed that the max. wool damage is caused by the HCl treatment in a closed vessel. Addnl. expts. proved that the degree of wool damage varied with the carbonization temp. and the conen. of the acids employed and that under the same conditions HCl causes more damage to wool than H_2SO_4 of equal conen. Another method of detg. the wool damage is based on the velocity of soln. of wool in KOH; this showed the same results. . . . A method for detg. the influence of carbonization on vegetable or cellulose-contg. fibres was developed which is based on the use of the I no. The results showed that the I no. increased and tear resistance in g. decreased with time (from 0.5 to 8 hrs.) and that with acids of equal strength the HCl treatment in open vessels damages cotton the most. The effect of the O of the air or of the change of the conen. of the acid during the treatment is at present unknown. Other expts. demonstrate that the time of immersing the cotton in acid as well as the pre-swelling in water distinctly affect the degree of decompn. However, only the first few min. of immersion are effective. After 30 min. a condition is established which changes only slightly with time. Addnl. tests under varying conditions show that for cotton the I no. increases and the tear resistance decreases with increasing temp. and acid conen. As the I no. always changes contrary to the tear resistance, I no. detns. were found to be suitable for carbonization investigations. (W)

Cloth and Yarn Drying: Control in. Reginald Trautschold. *Rayon Tex. Mo.*, 1937, April, P. 91–2; May, P. 78–9. (C)

Cloth Oils and Catalysts in the Mackey Test: Oxidation of Olive Oil. W. Garner. *Analyst*, 1936, V. 61, P. 519–28; *C. A.*, 1936, V. 30, Col. 7349; *J. T. I.*, Mar. 1937, P. P57–P68.

After discussing the desirable properties of a good combing oil, the author describes two processed oils and a synthesized ester oil which show marked resistance to oxidation, particularly the synthetic oil. (C)

Compression of Wool by Twist. James H. Fisher. *Rayon Tex. Mo.*, April 1937, P. 83–4. (C)

COTTON AND SPUN-RAYON YARN QUALITY IN WEAVING. H. Pomfret. *Tex. Mfr.*, April 1937, P. 141, 144.

The tendency of yarn is to lose quality during warp preparation, particularly extensibility, and it is suggested that control by testing would be of value. (C)

COTTON AND VISCOSE CHARACTERISTICS. *Am. W. & C. Rptr.*, April 8, 1937, P. 5–6, 39.

Discusses relative strength and shearing capacities, and presents data indicating that viscose is stronger with higher shearing point. Suggests that long cotton fibres of coarser diameters may be better than fine. (C)

COTTON SIZE MIXINGS. P. L. Mann. *Am. Dye. Rptr.*, April 5, 1937, P. 177–9. (C)

COTTON WARP SIZING: EVALUATING. H. C. Roberts. *Rayon Tex. Mo.*, 1937, April, P. 85–6; May, P. 58–9. (C)

CRÊPE TWIST: STUDIES ON. Y. Konishi. *J. Soc. Tex. Ind.*, Japan, 1936, P. 428, 435; abs. in *Rayon Tex. Mo.*, April 1937, P. 112.

After working out a formula for the change of crêped state, the author deals with the twist of crêped yarn along its axis. This is expressed by the formula

$$v \cdot \sin a = T - t, \quad \text{or} \quad \frac{\sin a}{r} = T - t$$

in which v is the number of turns of yarn helix, a the inclination thereof, T the twist of yarn before crêping, t the twist along the crêped yarn, and r the radius of yarn helix. When t calculated from the above relation (v, a, r and T are measurable directly) is compared with r obtained from microscopical observations (after Herzog's method), there exist great discrepancies which cannot be explained as experimental errors. On model experiments it is confirmed that the microscopical measurement of yarn twist is not reliable for hard twisted yarn. (C)

DEFORMATION OF CLOTH UNDER STRESS: APPLICATION OF DIFFERENTIAL GEOMETRY TO THE STUDY OF. J. R. Womersley. *J. T. I.*, Mar. 1937, P. T97–T112.

The study of the stress-strain relationships of cloth provides a unique opportunity for the application of the methods of differential geometry to a practical problem. The warp and weft threads, which are perpendicular straight lines in the ideal form of the cloth, become curved under stress, and form a natural system of curvilinear co-ordinates for the description of its deformed state. In the differential geometry of surfaces these "parametric" curves are usually chosen arbitrarily, or so as to give simple functional relations for the description of the properties of the surface, but in a piece of cloth they are physical entities the form of which is related to, and partly determines, the state of stress. Their form is, in fact, of greater importance than that of the surface itself, since they are in a very practical sense the units out of which it is built. The present paper, which is intended as the first step in a general treatment of the stress-strain rela-

tionships of cloth, gives the general equations of equilibrium of a cloth subject to tensions at its edges and a hydrostatic pressure normal to its surface, and describes their application to a simple problem, that of a circular cylinder of cloth subjected to tension at its ends. (C)

DOUBLE FABRICS: WEAVING. L. Gutkind. *L'Ind. Text.*, 1936, V. 54, P. 20–1; abs. in *J. T. I.*, April 1937, P. A193.

A method of producing double fabrics is described in which the two layers of fabric are connected by bands of fabric composed of both warp and weft threads instead of being connected merely by warp or weft threads or special binding threads. The connecting bands of fabric may be perpendicular or inclined to the upper and lower fabric layers, may be parallel or inclined to each other, and may be arranged longitudinally or transversally. The yarns, weaves, yarn densities, etc., in the upper and lower fabric layers and in the connecting bands may be the same or different. The fabrics may be woven on tappet, dobby or jacquard looms. Examples are shown and discussed. (C)

ELASTIC YARNS: NEW. Anon. *Tex. Wld.*, April 1937, P. 138–9.

Methods of manufacturing and merchandising "Filatex" and "Controlastic" yarns are described. (C)

EMBOSSED AND LUSTROUS RAYON FABRICS: PRODUCTION. R. Günther. *Textilber.*, 1936, V. 17, P. 943–4; abs. in *J. T. I.*, April 1937, P. A200.

Permanent patterns which are stable to water are produced on fabrics containing cellulose acetate rayon by passing between engraved rollers heated to 200° C. Lustrous pressed effects or embossed effects may be obtained. Interesting effects may also be obtained by rolling up smooth cellulose acetate rayon fabrics with coarse linen fabrics or fabrics with figured effects produced in weaving and heating or steaming. In order to produce embossed effects which are fast to water on viscose rayon fabrics it is necessary to fix the pattern by impregnation with synthetic resins. The lustre produced on cellulose acetate rayon fabrics by polishing with a hot, smooth-surfaced roller is fast to water but the lustre produced on viscose rayon fabrics by similar treatment is not so stable. It is advisable to coat the polished viscose rayon fabrics with a thin layer of cellulose acetate and then subject this to the friction treatment. (C)

RAYON CRÊPE YARNS: PRODUCTION AND PROPERTIES. W. Frenzel. *Kunstseide*, 1936, V. 18, P. 431–4; *J. T. I.*, Jan. 1937, P. A10.

The characteristics of rayon crêpe yarns are discussed and a German crêpe twisting machine is briefly described. The use of the Frenzel-Hahn twist tester for the determination of the contraction produced by twisting and the resulting change in count is outlined. (C)

RAYON FABRICS: ATTACK BY INSECTS. A. Herfs. *Textilber.*, 1936, V. 17, P. 689–704, 765–72; *J. T. I.*, Jan. 1937, P. A41. (C)

RAYON PIECE GOODS: NEW DRYING, CONDITIONING AND CREASE-PROOFING MACHINE FOR. B. M. Jones. Rayon Tex. Mo., Jan. 1937, P. 99. (C)

RUBBERIZING PROBLEMS: MODERN. Kehren. *Mell. Textilber.*, 1937, No. 3, P. 229.

A series of tests was carried out on rubberized fabrics with varying content of copper which were vulcanized by the hot and cold process respectively and the strength was determined. The results obtained by the author corresponded with those arrived at by Lothar E. Weber, according to which a copper content of less than 0.005% is not harmful, if the rubberizing process is carried out properly. (C)

SCOURING OF WOOLENS. I. PIECE SCOURING OF WOOLENS AND WORSTEDS. II. CARBONIZING AND MILLING OF WOOLENS AND WORSTEDS. H. Turner. *Tex. Mfr.*, 1937, Feb., P. 72–3; Mar., P. 113–15.

Effect of raw wool scouring, oiling in blending, and the nature of impurities in the scouring of woolens in many cases. (C)

SLASHING RAYON STAPLE. A. K. Landau. *Tex. Wld.*, Feb. 1937, P. 64–5.

Methods which insure good results in weaving and finishing. (C)

SOLUBLE STARCH FOR FINISHING, NEW PROCEDURES FOR PREPARING. *Tiba*, 1935, V. 30, P. 633; *Am. Dye. Rptr.*, Mar. 8, 1937, P. 138. (C)

SPUN AND CUT FILM EFFECT THREADS. A. Herzog. *Textilber.*, 1936, V. 17, P. 772–80.

Narrow ribbons for use as effect threads in braids, trimmings, etc., may be spun by a process similar to the spinning of rayon threads or may be obtained by cutting regenerated cellulose or cellulose ester films into strips. The strips may be cut from single films, from superposed layers of films of different properties, and from films with imbedded fibres, yarns, fabrics, or metal foils. The threads obtained by these methods may be delustred, dyed, printed, etc., as desired and may be folded and twisted, and also twisted with yarns of rayon or other textile materials. Numerous examples are described and photo-micrographs are given. (From *J. T. I.*, Jan. 1937, P. A11.) (C)

SYNTHETIC RESIN CHANGES FIBRE TRAITS: MAGIC OF. Charles H. Clark. *Daily News Record*, Textile Research Issue, Jan. 21, 1937, P. 8. (C)

TWIST FORMULAE: NOTE ON APPLICATION OF. J. T. Killian and E. R. Schwarz. *J. T. I.*, Oct. 1936, P. T237–T240.

It has been shown that in practice neither Schwarz's formula nor that of Woods is strictly correct. The errors in each are pointed out and a corrected expression is set up. This is based on the Schwarz formula, in as much as he has developed a convenient microscopic technique for making the twist measurements, and it is believed that this formula has greater practical value. Finally a chart is provided to facilitate determination of the necessary correction. (C)

TWISTING RAYON AND STAPLE FIBRE YARNS. E. Ullrich. *Kunsts.*, 1936, P. 391; *Rayon Tex. Mo.*, Feb. 1937, P. 95.

Slows how fibre fineness, roughness, flexibility, length, regularity of staple, elasticity and strength influence the twist and it is pointed out that

the twist required varies with the types of yarn and fabric to be produced. The relation between yarn thickness and twist is studied and twist constants for various rayon yarns are given. Also discusses the changes in the twist of yarns occurring in winding processes and when being drawn off the cop in weaving. (C)

UNSHRINKABLE FINISH FOR WOOL: NEW. A. J. Hall. *Canadian Tex. J.*, April 16, 1937, P. 39–40; *Tex. Mfr.*, April 1937, P. 157–58; *Am. Dye. Rptr.*, May 3, 1937, P. 239–41; *Tex. Col.*, May 1937, P. 299–300, 348; *Tex. Rsch.*, July 1937, P. 349–53.

Abstract of a lecture by A. J. Hall to the Manchester (Eng.) Section of the Society of Dyers and Colourists. A new process for making wool unshrinkable in washing uses sulphuryl chloride which, unlike the usual chlorine process, does not damage wool. (C)

VARIABILITY OF COTTON CLOTH STRENGTH. A. W. Bayes. *Tex. Mfr.*, Feb. 1937, P. 45–6, 50.

Abstract of a paper to the Industrial and Agricultural Research Section of the Royal Statistical Society, Jan. 21, 1937. It is devoted more to describing the problem than to solving it, first pointing out the likely sources of variation in the processes of cloth production, and providing some data. While the author indicates appreciation of the fact that in other than open weaves the stronger cloth may be made from the weaker yarn, and that this may also be true of laminated cloths and those treated with synthetic resins, he does not suggest in this abstract the substitution of tearing for tensile tests as the preferred method for measuring fabric strength. (C)

WARP SHADOW STRIPES IN DAMASK CLOTHS: CAUSE AND AVOIDANCE OF. H. Boffey. *J. T. I.*, Jan. 1937, P. T1–T12.

The origin of these stripes is shown to be the application of systematically unven tensions in the warp yarns during weaving due to the particular method of gaiting the loom involved in this case. The correct method for avoidance of the fault is suggested and practical results confirm the findings. An appendix is added which gives a simple formula for calculating the extension in a warp yarn at any point in the pick cycle. (C)

WORSTED YARN MANUFACTURE: CONTINENTAL SYSTEM OF. A. Poncelet. *Tex. Mfr.*, Feb. 1937, P. 47–8.

A discussion of typical plant, methods, speeds and production on the French system of worsted combing, drawing and spinning. (C)

III. CHEMICAL AND OTHER PROCESSING (NOT OTHERWISE CLASSIFIED)

COLOR IN TEXTILE MATERIALS. I. S. Brierly. *Tex. Mfr.*, Feb. 1937, P. 51, 77.

Polychrome mixture or fancy ranges of colored fibre mixtures. Effects on tone and hue of adding proportions of bright colors and possibilities of getting well-balanced ranges economically. (C)

COTTON-STAPLE FIBRE MIXTURE YARNS: MERCERIZATION. O. Mecheels. *Textilber.*, 1936, V. 17, P. 725–7, 804–6; *J. T. I.*, Jan. 1937, P. A22.

The effects of treatment of viscose rayon and staple fibre with caustic soda and caustic potash solutions are discussed and curves showing the swelling, shrinkage, loss in weight, strength and lustre are given for viscose staple fibre and cotton.(C)

DESULFURIZATION OF CRUDE VISCOSE RAYON: STUDIES ON. Philip C. Scherer. *Rayon Tex. Mo.*, 1937, Jan., P. 73–4, 78; Feb., P. 39–41. (C)

DIRECT DYEING: STATUS OF THEORY OF—, EXPLANATION BASED ON RESEARCH. F. C. Brown. *Tex. Col.*, Jan. 1937, P. 34. (C)

DISSOLUTION OF CHEMICALLY MODIFIED COTTON CELLULOSE IN ALKALINE SOLUTIONS. III. IN SOLUTIONS OF SODIUM AND POTASSIUM HYDROXIDE CONTAINING DISSOLVED ZINC, BERYLLIUM AND ALUMINIUM OXIDES. G. F. Davidson. *J. T. I.*, Feb. 1937, P. T27–T44. (C)

DYED KNITTED FABRICS: DEFECTS DUE TO TENSION. *Text. Merc. Argus*, 1936, V. 95, P. 516–7.

Dyeing faults and difficulties can often be traced to the effects of tension. Similar cotton yarns differing slightly as regards twist dye a slightly different shade with direct dyes. Dark-colored lines sometimes seen in locknit fabrics may be due to the fact that some threads are slacker than others. The unsuitability of the jigger in vat-dyeing cotton piece goods is due to its tendency to stretch the fabrics. In recent times attention has been given to the design of the jigger so that it exercises only a minimum stretch. From this point of view the winch dyeing machine is superior to the jigger, but it exposes the dye liquor to the air rather excessively. It is, however, suitable for dyeing with direct dyes. The structure of "ray-de-chine" is described; this fabric has a softer, fuller handle when dyed on the winch machine than when dyed on a jigger. The reason for this has been traced to the tension exercised by the latter on the material. An example is given of dyeing difficulty in a viscose rayon knitted fabric owing to tension differences. (From *J. T. I.*, Jan. 1937, P. A23.) (C)

DYED WOOL: CAUSES OF UNEVEN OR VARIABLE EFFECTS IN—(ABSORPTION OF SULPHURIC ACID BY WOOL). O. Mecheels and O. Goldschmidt. *Mell. Textilber.*, 1936, V. 17, P. 495–7, 656–7, 877; *J. Soc. Dyers Col.*, Feb. 1937, P. 79.

Procedure is described for determining whether the cause of variable effects on dyed wool is due to the origin or pre-treatment of the wool causing absorption of different quantities of dye from one and the same bath, or whether dyeing has been effected in two dyebaths. In this connection, factors influencing the absorption of sulphuric acid by wool have been investigated. (C)

DYEING AND PRINTING ANALINE BLACK: FUNCTIONS OF METALLIC AND ORGANIC CATALYSTS IN. E. Justin-Mueller. *Rev. Gen. Tein. Imp. Blanch. App.*, 1936, V. 14, P. 753–63; *J. Soc. Dyers Col.*, Feb. 1937, P. 76.

The mechanism of the action of metallic and organic catalysts in accelerating and completing the development of Aniline Black on the fibre has been investigated. It is concluded that copper salts of the sulphate type function in the Aniline Black condensation by dissociating the oxidizing agent and liberating active oxygen by dehydration. Organic catalysts are never used alone. Their main function is to complete the oxidation and condensation of Prussiate Blacks, and to give ungreenable blacks. Addition of aminoazobenzene to Prussiate Blacks prevents volatilization of aniline during passage of the goods through the steamer. (C)

DYEING: EFFECTS OF TENSION IN. *Am. Dye. Rptr.*, Mar. 8, 1937, P. 121–2, 136.

Explains how dyeing faults and difficulties may be caused by the presence of tight threads in piece goods. Reprinted from *Textile Mercury and Argus.* (C)

DYEING OF CELLULOSE WITH DIRECT DYES: IMPORTANCE OF COLLOIDAL CONSTITUTION OF THE DYE SOLUTION AND OF THE FINE STRUCTURE OF THE FIBRE. T. H. Mortan. *Trans. Faraday Soc.*, 1935, V. 31, P. 262–76.

The fine structure of viscose cellulose is shown to possess, in the unswollen state, a pore diameter of less than 5 A., and in the normal swollen state, 20 A. to 30 A. This value may be increased five-fold by swelling in sodium hydroxide solution. Direct dye molecules can only penetrate the capillaries in the swollen state. The rate of dyeing depends on the size of the dye aggregates, being most rapid for particle sizes approaching molecular. (Copied complete from *Eastman Kodak Abs. Bull.*, Dec. 1936, P. 552.) (S)

EMULSIONS: CLASSIFICATION OF. A. Rabinerson and L. Kremnev. *Acta Physicochimica*, 1936, V. 5, No. 1, P. 105–10. (In German.)

Emulsions as regards their material composition are divisible into three groups: (A) oil in water, (B) water in oil, and (C) fluid metal in water or other fluid. They are also divisible into: (a) dilute, (b) concentrated, and (c) foam-like. Metallic emulsions (C) are stabilized in the same way as (A) and (B); apparent differences are discussed. Foams (c) do not represent a disperse system in the ordinary sense; their stability is solely due to that of the lamellar framework of the foam. (From *Sci. Abs.*, Nov. 1936, No. 4958. (X)

ENZYME PREPARATIONS: PROPERTIES AND USES OF. *Tex. Col.*, 1937, Feb., P. 118–9; Mar., P. 174–5 (reprinted from *Dyer & Textile Printer*).

Substances which have baffled best brains in modern science; still known only by their effects; a presentation of essential facts. (C)

FASTNESS OF INDANTHRENE COLORS TO BLEACHING. E. Brandwood. *Canadian Tex. J.*, Feb. 19, 1937, P. 44–6.

Experimental work to determine effect of boiling dyed yarns in soda solutions and efficiency of various oxidizing agents. (C)

FILM FORMATION IN EMULSIONS. H. Wagner and G. Fischer. *Kolloid Z.*, Oct. 1936, P. 12–20.

Films formed in emulsions are described and classified. A new method of testing stability is described. (From *Sci. Abs.*, Dec. 25, 1936, No. 5447.) (X)

GLUE AND GELATINE CHEMISTRY FOR FINISHERS. Pegasus. *Tex. Col.*, Feb. 1937, P. 103. (C)

MATCHING THE SAMPLE. Henry E. Millson and Eugene W. Wall. *Tex. Col.*, 1937, Jan., P. 29–31; Feb., P. 120–3.

Results of an investigation designed to correlate the effects of improper drying and airing; to offset some rather generally held erroneous ideas about "oxidation" of certain colors, to consider the natural moisture content of the various fibres and its effect upon the ultimate match, and to point out some interesting and unusual behaviors of certain dyestuffs. (C)

MERCERIZATION OF MIXED TEXTILE FABRICS FROM COTTON AND SPUN RAYON: PROBLEM OF. II. Hermann Rath, Kuile and Jäger. *Z. ges. Textil-Ind.*, 1936, V. 39, P. 493–7; *C. A.*, 1936, V. 30, Col. 5420, 7858. (W)

MERCERIZATION OF STAPLE FIBRE YARNS. Otto Mecheels, L. Schmitz and J. Weber. *Silk J.*, 1936, V. 13, No. 148, P. 26.

A symposium is given on: why and where rayon and staple fibre is damaged during mercerization; the behavior of viscose staple fibre in different liquors; the effect of salt added to caustic soda solns.; and whether KOH could be used in mercerizing liquors. (From *C. A.*, 1936, V. 30, Col. 8626.) (W)

METAL SPRAYING: APPLICATIONS OF—IN THE DYEING AND TEXTILE INDUSTRIES. N. H. Kitchen. *J. Soc. Dyers Col.*, Dec. 1936, P. 449–55. (C)

MOISTURE IN TEXTILE PROCESSING. A. J. Hall. *Tex. Merc.*, 1936, V. 95, P. 145.

The effects of regain on dyeing and finishing processes. (From *C. A.*, 1936, V. 30, Col. 8625.) (W)

OLIVE OIL ALTERNATIVES. *Wool Rec.*, 1936, V. 50, P. 803–7, 861–3.

Garner's work on the Mackey test for liability to oxidation of olive oil is reviewed (see *J. T. I.*, 1936, P. A557). A process has been evolved for preparing an olive oil which has, and retains, a perfect Mackey test even after the addition of substantial amounts of iron. Arachis, or groundnut, oil processed in the same way replaces olive oil satisfactorily, and in the presence of iron salts it is superior to commercial olive oil. The composition of Nilox processed arachis oil (patented) and of Nilox ester oil (shortly to be on the market) is given. (From *J. T. I.*, Jan. 1937, P. A42.) (C)

PERMANENT FINISHES: SEVERAL PROCESSES NOW IN USE FOR TREATING COTTON FABRICS TO PRODUCE. John T. Gibbons. *Tex. Wld.*, Aug. 1936, P. 70–1. (C)

PHOTOGRAPHIC PRINTING ON TEXTILES. Walter Simon. *Dyer*, 1936, V. 75, P. 223.

Formulas are given for printing different colors on textiles photographically. (From *C. A.*, 1936, V. 30, Col. 8622.) (W)

PIECE DYEING OF SEMI-WOOL TEXTILES. Gerd Nitschke. *Monatschr. Textil-Ind.*, 1936, V. 51, P. 238–40; *C. A.*, 1937, V. 31, Col. 261. (W)

PRINT-SHOP CREASES ON SHEER COTTON FABRICS: CAUSES AND CURES FOR. Francis A. Newton. *Tex. Wld.*, Feb. 1937, P. 66. (C)

"RABASSA" VIBRATION DYEING MACHINE. Longclose Engineering Co., Ltd. *Tex. Mfr.*, 1936, V. 62, P. 181.

The principle of bombardment dyeing, and its advantages, are described. Certain speculations on the underlying theory are discussed. The "Rabassa" machine, which gives remarkable penetration in a very short time, is considered in this connection, and the maker's theory of vibration is discussed. The machine, its application, and advantages are described. (C)

RAPID AGEING: HOW DIFFICULTIES CAN BE BEST AVOIDED. W. A. White. *Tex. Recdr.*, July 1936, P. 45–6. (C)

RAYON DYEING AND FINISHING INDUSTRY: RECENT DEVELOPMENTS IN THE. B. L. Hathorne. *Am. Dye Rptr.*, Nov. 30, 1936, P. 643–4. (C)

RAYON SIZES. Fritz Ohl. *Kunstseide*, 1936, V. 18, P. 102–4.

The use of water-sol., protein-cleavage products of high mol. wt. and synthetic polymerized org. substances for sizing rayon is discussed. Sizing tests with glycol boriborate and a complex Na boro-phosphate are described and tables are given showing the film qualities, quantities of size taken up by viscose and acetate rayons, and phys. properties of the sized yarns. These new sizes are removed readily by washing the sized yarn with warm water. In contrast to linseed-oil sizes, the new sizes are easily removed even after the sized yarn has been stored for long periods. (From *C. A.*, 1936, V. 30, Col. 7860.) (W)

RESORPTION OF ANILINE THROUGH TEXTILES OF PLANT AND ANIMAL ORIGIN. Franz Lieb. *Arch. Hyg. Bakt.*, 1936, V. 116, P. 314–6.

Various textiles have the ability to absorb $PhNH_2$ vapors from the air; cotton and wool are absorbed relatively strongly; silk and rayon, slightly. (From *C. A.*, 1937, V. 31, Col. 263.) (W)

RETARDING EFFECT OF STANNOUS SALTS ON THE OXIDATION OF OLEINS AND OILS. S. H. Bertram. *Tex. Mfr.*, Nov. 1936, P. 430–1.

The oxidation of oleins and oils, important in worsted and woolen spinning, may be retarded considerably by the addition of oil-soluble

stannous compounds in amounts equivalent to about 0.1% of tin; the induction period is greatly prolonged, and the velocity of oxidation once started is diminished. These tin compounds are free from the disadvantages of other anti-oxidation catalysts, being non-poisonous and causing no stains on heating. (The paper of which this article is an abstract is published by the International Tin Research and Development Council.) (C)

SINGLE-BATH DYEING: IMPROVEMENTS IN INDIGOSOL DYEING, WITH SPECIAL REFERENCE TO. W. Dietrich. *Mell. Textilber.*, 1936, P. 500; *Rayon Tex. Mo.*, Jan. 1937, P. 105. (C)

SPUN RAYON, SPUN RAYON MIXED YARNS AND THEIR DYEING. W. Kegel. *Monatschr. Textil-Ind.*, V. 51, Fachheft II, July 1936, P. 47–9.

A review of precleaning, bleaching and dyeing. (From *C. A.*, 1937, V. 31, Col. 261.) (W)

STABILIZED AZOIC COLORS: CHEMISTRY OF THE. Herbert A. Lubs. *Am. Dye. Rptr.*, Feb. 22, 1937, P. 101–3.

Paper presented at Saturday afternoon session, Annual Meeting of A. A. T. C. C., Providence, R. I., Dec. 5, 1936. (C)

STARCH: MOLECULAR STRUCTURE. H. Staudinger and H. E. Eilers. *Ber. Dtsch. Chem. Ges.*, 1936, V. 69, P. 819–48; *J. T. I.*, Aug. 1936, P. A402. (C)

STARCHES: FUNDAMENTAL PROPERTIES OF. G. V. Caesar. *Am. Dye. Rptr.*, Jan. 25, 1937, P. 44–5.

Paper presented at annual meeting of A. A. T. C. C., Providence, R. I., Dec. 5, 1936. (C)

TEXTILE PROCESSING IN ENGLAND: ONE YEAR OF. A. J. Hall. *Am. Dye. Rptr.*, Nov. 30, 1936, P. 654–6. (C)

TEXTILE WET PROCESSING: NEW PRODUCTS FOR. *Am. Dye Rptr.*, Nov. 30, 1936, P. 657–64, 675–88.

Both products and list of manufacturers are given and arranged alphabetically. (C)

TIN-WEIGHTING PROCESS: EFFECT OF—ON STRENGTH OF NEW SILK. I. Winifred M. Forbes and Pauline Beery Mack. *Rayon & Mell. Tex. Mo.*, 1936, V. 16, P. 719–21, 728; III. Effect of Dark-room Storage on Unweighted and Tin-weighted Silk. Anne A. D'Olier and Pauline Beery Mack. *Ibid.*, V. 17, P. 102. (W)

UNSHRINKABLE FINISH OF WOOL GOODS: STUDIES ON THE. T. Nakahara and K. Tanaka. *J. Soc. Tex. Ind., Japan*, 1935, P. 279; *Rayon Tex. Mo.*, Aug. 1936, P. 84.

Using the calcium and sodium hypochlorites as chlorinating agents, the authors investigated the effects of concentration (available chlorine), temperature and the duration of time of treatment on the wool fibre with the following results: (1) The amount of chlorine absorbed by the fibre and the

degree of damage (loss in weight, strength and elongation, etc.) caused by the treatment increased with promotion of the concentration, temperature and time of treatment. (2) In dilute solution, more loss in weight of the fibre occurred with calcium hypochlorite than with the sodium salt, whereas in strength and elongation, especially elasticity, the opposite is the case. (C)

WATERPROOFING TEXTILE PRODUCTS, WITH PARTICULAR CONSIDERATION OF THE NEW METHODS. Rudolf Buchheim. *Deut. Färber-Ztg.*, 1936, V. 72, P. 43–7, 56–8, 67–70, 79–82, 96–100.

A review dealing with the historical development, impregnation methods (use of oils, Al salts, oils and Al salts and other treatments), theories, industrial procedures and methods of testing. (From *C. A.*, 1937, V. 31, Col. 263.) (W)

WOOL: ACTION OF ALKALIES ON. Hans J. Henk. *Klepzig's Textil-Z.*, 1936, V. 39, P. 670; *C. A.*, 1937, V. 31, Col. 544. (W)

WOOL: DO DICHROMATES DAMAGE? Bedu. *Klepzig's Textil-Z.*, 1936, V. 39, P. 691; *C. A.*, 1937, V. 31, Col. 545.

The literature on the action of $K_2Cr_2O_7$ and $Na_2Cr_2O_7$ on wool is reviewed. It is assumed that the affinity between the Na and the chromate or dichromate is decreased by the presence of the wool and that consequently the former is free to exert its damaging action upon the textile. (W)

WOOL DYES WHICH ARE FAST TO SEA WATER. Georg Rudolph. *Z. ges. Textil-Ind.*, 1936, V. 39 P. 517–18.

Numerous acid, palatine fast, meta chrome and after-chrome dyes are listed which are suitable for dyeing wool yellow, orange, pink, red, Bordeaux, orange, brown, violet, blue, green, gray and black. Dyeing directions are given and five dyed samples are shown. (From *C. A.*, 1936, V. 30, Col. 7853.) (W)

IV. RESEARCH METHODS AND APPARATUS

ANIMAL HAIRS: QUANTITATIVE ANALYSIS OF BLENDS OF. John H. Skinkle. *Am. Dye Rptr.*, Mar. 8, 1937, P. 119–20. (C)

AUTOMATIC RECORDING TWIST COUNTER. Walter Frenzel. *Mell. Textilber.*, 1937, No. 3, P. 209.

The author has designed an automatic recording twist counter which records the lengthening and shortening automatically. The article describes five different investigations and discusses the diagrams obtained with the new appartus. (C)

APPARATUS FOR TESTING COATED FABRICS. Roy C. Bowker. *Rayon Tex. Mo.*, Jan. 1937, P. 57, 78.

Tests under controlled conditions give information equivalent to that obtained with the "hand scrub test." Apparatus developed at National Bureau of Standards. (C)

ARTIFICIAL FIBRES: CAUSES, TREATMENT AND MEASUREMENT OF THE CREASING OF FABRICS OF. *Mell. Textilber.*, 1937, No. 3, P. 241.

The author reviews the literature on the subject and then calls attention to the new Preska process for imparting to various types of staple fibre the characteristics of wool. The following process is recommended for testing the resistance of a fabric to creasing: A strip about 4 cm. in length and ½ cm. in width is cut from the cloth, the two ends are folded together, and the sample is completely covered by a one-kilo weight, which creases the strip of cloth exactly in the centre of its length. After having been weighted for a certain time, the weight is removed and the strip of cloth rises to a definite angle, depending upon its elasticity. The cloth with its angle is then turned by means of a pincette upon its longitudinal edge and allowed to rest for a certain time, after which the angle is plotted on a sheet of paper by tracing the sides and can be measured. (C)

CALCULATING THE STANDARD DEVIATIONS OF OBSERVATIONS: ABBREVIATED METHOD AND A SUGGESTED CHEAP MECHANICAL DEVICE FOR. J. L. Spencer-Smith and H. A. C. Todd. *J. T. I.*, Feb. 1937, P. T21–T6.

A rapid graphical method of calculating the standard deviation of a set of observations, by means of Galton's "ogive" curve, is described. The "ogive" curve is projected into a straight line by plotting on "probability" paper, and is completely determined for normal distributions by the percentage number of observations which are less than two given values. The standard deviation is read off from the straight line joining these two points. A comparison of the results of the method with the root mean square standard deviation is given and the probable error of the method estimated to be 3.5%. The application of the method as an integrator for routine testing machines is discussed. (C)

CALIBRATION OF A "CONSTANT RATE OF LOADING" MACHINE FOR TESTING THE TENSILE PROPERTIES OF TEXTILES. Richard S. Cleveland. *Rayon Tex. Mo.*, 1937, Mar., P. 75; Apr., P. 50–2.

Two methods are described for calibrating a "constant rate of loading" machine of the tilting plane and rolling cart type which has recently come into use in the textile industry. The use of this type of machine is provided for in the "Proposed Tentative Specification for Textile Testing Machines," A. S. T. M. designation D-76-35T but no method is given for its calibration either in the specification or in the literature describing it. One method is based on the use of a pulley and weights and the other on the use of calibrated springs. A typical load-elongation curve for both loading and unloading is shown and the significance of its various parts is discussed in relation to use of the calibration. (C)

COMMERCIAL SOAPS AND SOAP PRODUCTS: STANDARD METHODS FOR THE SAMPLING AND ANALYSIS OF—REVISED. Committee on Analysis of Soaps and Soap Products of the American Chemical Society. *Ind. & Eng. Chem., Anal. Ed.*, Jan. 15, 1937; *Rayon Tex. Mo.*, 1937, Mar., P. 85–6; May, P. 89–90; June, P. 83–5.

COTTON YARNS: MOISTURE RELATIONS. R. Setzer. *Textilber.*, 1936, V. 17, P. 714–6.

An arrangement for studying the rates of adsorption and desorption of moisture by yarn forming the inner layers of wound packages comprises

a closed chamber into which are introduced a thermometer and two hygrometers of the type in which the sensitive hair element is enclosed in a perforated tube. The yarn is wound tightly round the tube of one hygrometer to form a layer 18 mm. thick and metal discs are placed at each end. The system is left until both hygrometers give the same reading and the humidity of the air in the chamber is then rapidly increased to 90%. The readings of the hygrometers are recorded and when the hygrometer carrying the yarn records 90% the humidity of the air is rapidly reduced to its original value and hygrometer readings are again recorded until the original value is again reached. Graphs showing the results obtained with cotton yarn and cotton roving together with the moisture contents corresponding to the hygrometer readings are given. (From *J. T. I.*, Dec. 1936, P. A628.) (C)

COTTON WOOL: THERMAL CONDUCTIVITY; EFFECT OF HYDROGEN. Y. Takamura. *Proc. Phys. Math. Soc., Japan*, 1936, V. 18, P. 280–6 (through *Sci. Abs.*, 1936, A39, P. 1112).

Two specimens of cotton wool form two parallel plates; the top surface is heated by steam and the lower surface cooled by ice, and the temperature between the two plates is measured by a thermocouple. The lower pad is the standard—cotton wool containing air. The upper pad is slowly filled with mixtures of air and hydrogen. Values of the ratio between the conductivities in the two pads when plotted against the percentage of hydrogen give nearly a straight line. From the known conductivity of air in cotton wool, that of hydrogen is calculated. (From *J. T. I.*, Jan. 1937, P. A37.) (C)

DAMAGE IN SILK: DETERMINATION OF. S. R. Trotman. *J. S. C. I.*, 1936, V. 55, P. 325T–7T.

The damage to silk caused by degumming, dyeing, and exposure to light has been investigated by the viscosity method previously described (cf. *J. S. C. I.*, 1935, V. 52, P. 342). The results show that degumming with pancreatin may injure the fibroin, although at the same time failing to effect complete degumming. Sodium carbonate in the degumming bath has a particularly deleterious action. Injury occurs in dyeing if the temperature of the dyebath is too high, or if sodium chloride or sulphate is present. The presence of sodium hydroxide in silk reduces the damage caused by exposure to light. Silk gum does not completely protect fibroin against the action of light. The concentrated ultra-violet light from a Fadeometer apparently acts differently from sunlight. (From *J. Soc. Dyers Col.*, Feb. 1937, P. 79.) (C)

DYED MERCERIZED COTTON: DETERMINATION OF DEGREE OF MERCERIZATION. L. P. Michel. *Tiba*, 1936, V. 14, P. 617–21, 685–9.

Edelstein's test for mercerization in the presence of dyes, which is a modifications of Neale's baryta absorption test, is described. Details of the procedure are given and certain improvements are suggested. The effects of time, temperature and concentration and various other factors are discussed. By this method it is possible to determine approximately the concentration of the caustic soda used in mercerization. (From *J. T. I.*, Jan. 1937, P. A38.) (C)

FINENESS OF FIBRES: DETERMINING—ACCORDING TO THE WEIGHING METHOD. Herbert Fischer. *Rayon Tex. Mo.*, Dec. 1936, P. 52–3; Feb. 1937, P. 42.

A fibre meter (German patent No. 510, 298) and its use for measuring average fibre length and fineness are described. (C)

IDENTIFICATION OF TEXTILE FIBRES BY CHEMICAL REACTIONS. *Rayon Tex. Mo.*, Mar. 1937, P. 88.

Published in tabular form for ready reference. (C)

MEASUREMENT OF THE FLUIDITY (OR VISCOSITY) OF COTTON IN CUPRAMMONIUM SOLUTION. D. A. Clibbens and A. H. Little. *J. T. I.*, Dec. 1936, P. T285–T304.

The measurement of the rate of flow of cellulose solutions, in addition to possessing fundamental importance, has proved of great value in controlling the chemical processing of cellulose textiles, and in diagnosing the causes of deterioration in cotton and other cellulose materials. The viscometer used and described with calibration results is called the X-type. Analysis shows that the flow of true viscous liquids in the X-type viscometer is expressed with reasonable accuracy by the Poiseuille Law. Pure phenyl ethyl alcohol is suggested as an ultimate reference standard for the calibration of viscometers suitable for fluidity measurements in the range of principal interest. Further observations are recorded showing that the deviation of the flow of cellulose solutions from the Poiseuille Law diminishes with falling concentration of a given cellulose sample, and with increasing chemical degradation of the cellulose. This effect of chemical degradation in causing the solution to approximate more closely to a true viscous liquid was first shown by Clibbens and Geake though the fact has apparently escaped notice by some later workers (Sakurada). The composition, density and fluidity of the standard cuprammonium solvent now used in these laboratories are given.

The application of fluidity measurement for detecting the source of damage to defective cotton goods is described in one or two particular cases. The requirements sometimes necessitate the measurement of fluidity with much smaller samples of cotton than those needed for observations with 0.5% solutions in the capillary type of viscometer (0.1 gram). To meet these special requirements a rolling sphere viscometer has been designed suitable for use with 0.5% solutions when only 0.01 gram of cellulose is available; the instrument, its calibration, method of use and limitations are described. Data are recorded for the effect of heat on the fluidity of cotton containing various acids and salts. The most satisfactory method for showing that finished cotton goods are free from "injurious chemicals" likely to cause deterioration of the cellulose during storage is by means of fluidity measurement before and after subjecting the cotton to a standard heat treatment. (C)

MICROMANIPULATOR. P. de Fonbrune. Bull. soc. franc. *Phot.*, June, 1936, P. 139–43 (from *Research and Invention*, Sept. 1935, P. 252).

A micromanipulator is described in which the movements of the instrument are controlled by a single lever, the impulses of which are transmitted to the instrument by pneumatic pressure. The advantages of this construc-

tion are: (1) the simplification of the microtechique over the types of manipulator requiring screw adjustment, and (2) the elimination of the hazard of jarring the instrument with the hand when attention is directed to the microscope, since the control may be placed a safe distance from the instrument, and connected to it by flexible rubber tubing. (From *Eastman Kodak Abs. Bull.*, Dec. 1936, P. 546.) (S)

PHOTO-ELECTRIC YARN REGULARITY TESTER. H. J. Henning. *Textilber.*, 1936, V. 17, P. 709–12; *Rayon Tex. Mo.*, Jan. 1937, P. 104.

An improved form of apparatus for the determination of yarn regularity by the photo-electric method described by Franz and Henning is described in detail and shown in diagrams. The use of the device for counting neps in yarns is mentioned. (From *J. T. I.*, Dec. 1936, P. A629.) (C)

PHOTOGRAPHICALLY-RECORDING FIBRE TENSILE TESTING MACHINE. P. Chevenard. *C. R. Acad. Sci.*, 1935, V. 200, P. 212–14; 1936, V. 203, P. 841–3.

A device is briefly described which is capable of tracing load-extension diagrams with fibres of 1 to 10 mm. length, the breaking load of which is no more than 0.02 gram. Typical diagrams are reproduced for rayon, silk, wool, ramie and camel's hair. (From *J. T. I.*, Jan. 1937, P. A36.) (C)

ROTATION VISCOMETERS. W. Philippoff. *Arch. Tech. Messen*, 1936, V. 5, P. T83–T4.

The principles underlying rotation viscometers are outlined. The following types of viscometer are illustrated and briefly described: Hatschek-Couette, Searle, Kämpf, Stormer, Wolarowitsch, and Babcock. Their respective advantages and disadvantages are mentioned. (From *J. T. I.*, Oct. 1936, P. A501.) (C)

TEXTILE TESTING METHODS: UNIFICATION. F. P. Slater. *Tex. Wkly.*, 1936, V. 18, P. 581–2, 615–6.

The necessity for standardization in the textile industry and for unified testing methods is stated, and emphasized by examples of confusions which arise under the present conditions. Some account is given of the progress which has already been made in America and France. It is pointed out that tests for properties such as electrical insulation, shrinkage, mercerization, color fading and wearing quality present additional difficulty. It is the author's opinion that an important first step is to standardize the atmosphere in which the testing is carried out. The necessity for this is illustrated by tables of results of tensile tests on yarns. (From *J. T. I.*, Jan. 1937, P. A36.) (C)

TEXTILE TESTING PROCESSES: BASIS OF STANDARDIZATION OF. H. Sommer. *Mell. Textilber.*, 1937, No. 3, P. 206.

The author first reviews standardization and its importance for the textile industry, and then deals in detail with the various testing processes. He shows how the physical properties of yarns were used as basis of standardization in Germany for the mechanical-technological processes for testing textiles. Further the extent to which the moisture content of tex-

tile fibres depends upon atmospheric humidity and temperature, upon their strength properties, and other factors is discussed with the aid of numerous diagrams. The article further deals with the effect of the size of test samples upon strength properties, the influences of the speeds at which changes of form take place upon the strength properties, and the way in which the bursting strength depends upon the extent of the testing surface and its relation to tensile strength. (C)

VISCOMETER: ABSOLUTE. S. Erk and A. Schmidt. *Physikal. Z.*, 1936, V. 37, P. 489–96.

Improvements in the absolute viscometer used at the Physikalisch-Technischen Reichsanstalt are described, and the new apparatus is illustrated. The measurement range is extended by making the capillaries interchangeable and exchangeable. Choice and calibration of capillaries is described, also the determination of the end cross-section. The Jena KPG capillary tubing is recommended. The diameter was measured by different methods of three deliveries of capillaries made of Jena "apparatus glass 20" with orifices 1, 2.13 and 3 mm. wide, and it was found that ordinary drawn-out capillaries, besides being conical and not perfectly circular, have constrictions at regular intervals, probably due to the method of drawing out. The accuracy of measurement reached with the new instrument is $\pm$ 0.2%. (From *J. T. I.*, Oct. 1936, P. A506.) (C)

V. ECONOMICS, PHYSICS AND MISCELLANY

ABLE RESEARCH GROUP. E. T. Pickard. *Daily News Record*, Textile Research Issue, Jan. 21, 1937, P. 18.

Outlines development of textile research in this country, and particularly the accomplishments and character of Textile Foundation activities. (C)

AUTOMATIC pH MEASUREMENT APPARATUS. F. Müller and W. Dürichen. *Z. Elektrochemie*, 1936, V. 42, P. 730–2.

A method is described by means of which it is possible to measure pH automatically with the aid of a glass electrode. The method depends upon combination of a valve potentiometer with a photo-electric galvanometer amplifier. A wiring plan is given. (From *J. T. I.*, Dec. 1936, P. A644.) (C)

AMINO ACIDS AND PROTEINS: REACTION WITH HYPOCHLORITES. N. C. Wright. *Biochem. J.*, 1936, V. 30, P. 1661–7; *J. T. I.*, Dec. 1936, P. A644. (C)

BARRIER-LAYER PHOTOELECTRIC CELL IN PHOTOELECTRIC PHOTOMETRY. A. W. Smith, H. Newhouse and P. Drake. *Rev. Sci. Instr.*, Nov. 1936, P. 433–4.

When the barrier-layer photoelectric cell is used in measuring the intensity of polarized light, errors may arise which depend upon the direction of the electric vector with respect to the plane of incidence. Curves are given which show that these errors may amount to as much as 30%. (From *Sci. Abs.* (1936) Dec. 25, No. 5532.) (X)

BRITISH AND JAPANESE TEXTILE PRODUCTION COSTS: COMPARISON. C. Clark. *M/cr. Guard. Comm.*, 1936, V. 33, P. 283–4, 303–4.

Reasons for the cheapness of Japanese goods are briefly discussed and a detailed analysis is made of prices and spinners' margins, loss and profit, labor costs, output per operative, numbers of operatives employed, size of mills, cloth selling prices at factories, salary costs, finishing costs, etc., in the cotton industries in Britain and Japan. Similar figures for the wool and worsted industries in the two countries are also compared. (From *J. T. I.*, Dec. 1936, P. A651.) (C)

CELLULOSE: STRUCTURE. K. Freudenberg. *Ber. Dtsch. Chem. Ges.*, 1936, V. 69, P. 1627–31.

Two important questions with regard to the structure of cellulose are posed: (1) Is cellulose highly polymerized; *i.e.*, are the glucose units fastened together in primary valency chains to form the large molecules? (2) What are these linkages? These two points are discussed in a general manner in the light of all the evidence available, and the conclusion is finally reached that cellulose is highly polymerized, and is an extension of its oligo-saccharides, and, like these, has β-glucoside linkages. (From *J. T. I.*, Nov. 1936, P. A569.) (C)

CELLULOSE AND STARCH: MOLECULAR STRUCTURE. G. F. Davidson and W. A. Richardson. *Science Progress*, 1936, V. 31, P. 68–77.

A brief account is given of the evidence which has led to the adoption of the molecular chain theory to explain the structure of starch and cellulose. The heterogeneity of these compounds is discussed and explained in terms of molecular chain length. The data on length of the molecular chains are so varied that the only conclusion which may safely be drawn is that molecular chains of natural cellulose contain at least several hundred glucose units. The average chain length of starch is yet more uncertain. The contrasting physical properties of cellulose and starch are explained in terms of the only constitutional difference between their molecules. The properties of chemically modified celluloses and starches are briefly described. (From *J. T. I.*, Nov. 1936, P. A570.) (C)

COLLOID PARTICLES: INFLUENCE OF AN ELECTRIC FIELD ON THE INTENSITY OF TYNDALL LIGHT FROM. H. Uerlings. *Phys. Z.*, Sept. 15, 1936, P. 655–7.

When placed in an electric field, sols with non-spherical particles give enhanced Tyndall light if the directions of the field and the electric vector coincide and are perpendicular to the line of observation. If the field is perpendicular to the electric vector, the scattering intensity is diminished. The effect of the field on the orientations of the particles is photographed under ultra-microscope. (From *Sci. Abs.*, Nov. 25, 1936, No. 4954.) (X)

CROSS-LINKAGE FORMATION IN KERATINS. H. Phillips. *Nature*, 1936, V. 138, P. 121–2.

The decomposition of the sulphenic acid side-chains, produced by cystine disulphide hydrolysis, when wool and hair are treated with alkaline solutions, may produce aldehyde groups which will lead to resistant cross-linkage formation of the type —N = CH— between adjacent peptide chains. Sodium

sulphide added to fresh lime liquors assists unhairing because it reduces the sulphenic acid side-chains and thus prevents the formation of aldehyde groups; primary amines also assist unhairing since they condense with and mask the aldehyde groups arising from sulphenic acid decomposition and thus prevent cross-linkage formation. (From *J. T. I.*, Nov. 1936, P. A578.) (C)

ERRORS, THEORY OF: APPLICATION. H. Kaiser. *Z. tech. Physik*, 1936, V. 17, P. 219–26; *J. T. I.*, Oct. 1936, P. A502.

The fundamental principles of the theory of error are summarized and set forth in connection with probability calculations. (C)

EXPERIMENTAL DATA: STATISTICAL TREATMENT. W. Bothe. *Physikal. Z.*, 1936, V. 37, P. 520–2.

Problems in the application of statistical methods to measurements are briefly discussed. When accidental events are observed they seem to fall into small groups—mostly groups of two. The question how far this impression is in accordance with the laws of chance is discussed and tested mathematically. Such group-statistics form a simple method of testing the statistical purity of a series of experiments. (From *J. T. I.*, Oct. 1936, P. A506.) (C)

POTATO STARCH: TESTING. *Tiba*, 1936, V. 14, P. 683–5.

Tests for use in the evaluation of potato starch for sizing purposes, including tests for moisture content, mineral matter, acidity, purity, paste formation and fluidity, are briefly described. (From *J. T. I.*, Jan. 1937, P. A41.) (C)

PROBLEMS OF THE TEXTILE INDUSTRY: APPLICATION OF EXACT KNOWLEDGE TO. R. E. Rose. *Canadian Tex. J.*, Feb. 19, 1937, P. 40–3, 52.

Address at annual meeting of Canadian Association of Textile Chemists and Colorists, Feb. 6, 1937. (C)

REGULATORS AND CONTROLLERS. E. H. Hammond. *Tex. Wld.*, Feb. 1937, P. 81.

Describes and discusses self-actuated and air-actuated controllers and regulators for temperature, humidity, pressure, liquid level, and steam flow. (C)

RESEARCH PLAN OF LARGE TEXTILE GROUP DETAILED. Anon. *Daily News Record*, Textile Research Issue, Jan. 21, 1937, P. 34.

That of Wellington, Sears & Co., and associated mills is subject of the article. Activities range from watching cotton crop to co-operating in promotion of customer-trades. (C)

RESEARCH: BASIC STUDY JUST STARTING. E. R. Schwarz. *Daily News Record*, Textile Research Issue, Jan. 21, 1937, P. 44.

Great contributions of textile research lie in the future. (C)

RESEARCH-SALES STAFFS: CLOSE CONTACT BETWEEN. Warner Eustis. *Daily News Record*, Textile Research Issue, Jan. 21, 1937, P. 45.

Describes organization in three divisions of research groups serving the Kendall Co.'s cotton mills in six states and in Canada. (C)

SCIENTIFIC RESEARCH: VALUE OF—TO TEXTILE MANUFACTURING. Charles H. Clark. *Tex. Bull.*, Feb. 11, 1937, P. 14, 62. (C)

STARCH PRODUCTS: ANALYSIS. A. Regnaudin. *Bull. Assoc. Chimistes*, 1936, V. 53, P. 477–9 (through *Chem. Zentr.*, 1936, ii, P. 1630).

In Baudry's polarimetric method for determining starch, a residue of cellulose, etc., is rejected. The viscosity of 2.5% starch sol falls as the amount of this residue in the sample increases. In Roessing's method, in which glucose is determined after acid hydrolysis, this residue enters into the analysis. Thus the ratio of the result of the "chemical" analysis to the "optical" figure may be taken as a measure of the viscosity-lowering impurity. Values (× 100) recorded are farina, first quality 101.8, second 105–109.6; cassava 104–108; sage 102; arrowroot 104.7; wheat 118.1; maize 112.6; rice 115.5. (For Baudy and Roessing's method *see* Walton's "Starches.") (From *J. T. I.*, Dec. 1936, P. A639.) (C)

STRUCTURES AND FORCES IN COLLOIDAL SYSTEMS. H. Freundlich. *Roy. Inst. Proc.*, 1936, V. 29, No. 2, P. 232–52.

The author gives an account of the history and structure of colloids generally and in particular defines the term "isothermal reversible sol-gel formation" as "thixotropy." The lecture then concerns itself with the structure and forces concerned in thixotropic materials, particularly grain size, and the distinction between thixotropy and coagulation, and its function as the counterpart of dilatancy. Plasticity like thixotropy is linked up with close packing. The author illustrates his lecture with simple popular examples and finally draws attention to the application to biological phenomena, and discusses tactoidal formations. An excellent summary. (From *Sci. Abs.*, Nov. 1936, No. 4955.) (X)

SURFACE ACTIVITY OF NON-POLAR MOLECULES OF HYDROCARBONS. Part I. A. Taubmann. *Acta Physicochimica*, 1936, V. 5, No. 3, P. 355–80. (In English.)

The surface activity of a number of cyclic and fatty hydrocarbons and of some of their Cl derivatives is investigated by obtaining the surface tension isotherms of their solutions at liquid-liquid (paraffin-oil-water) and liquid-gas (nitrobenzene-air interfaces. It is shown that in the case of sufficient differences in polarities at interfaces for which the rule of equalization of polarities is satisfied, the non-polar molecules of hydrocarbons are surface-active and yield typical adsorption isotherms which obey the Langmuir-Szyszkowski equation. For the various homologous series of hydrocarbons investigated, the increase in surface activity follows the Traube rule, though with different coefficients. The molecular constants of the adsorption layer are calculated, from which it is ascertained that, in an adsorption layer, non-polar molecules assume horizontal positions which they retain at all the stages of condensation until the layer is saturated. It is shown that the usual equation of state of two-dimen-

sional layers is applicable to the adsorption layers of hydrocarbons. (From *Sci. Abs.*, Dec. 25, 1936, No. 5444.) (X)

VISCOSITY OF DILUTE SOLUTIONS: METHOD AND MEASUREMENT OF HYDROCARBON SOLUTIONS. K. H. Meyer and A. van der Wyk. *Kolloid-Z.*, 1936, V. 76, No. 3, P. 278–89; abs. in *Eastman Kodak Abs. Bull.*, Mar. 1937, P. 145.

The authors discuss the technique of viscosity measurements and show that the usual methods lead to great uncertainties in calculated specific viscosity values. By definition, specific viscosity is: $\eta_{sp} = \eta_{rel} - 1$, where η_{rel} is the relative viscosity and, hence, this quantity (η_{rel}) must be known with a high degree of accuracy in order to assure reasonable accuracy for specific viscosity values. By a method of repeated filtrations and refined technique, the uncertainty of specific viscosity values was lowered to $\pm$ 0.0005 η_{sp} units. It is also shown that Staudinger's constant (k_m) depends not only on the length of the dissolved macromolecules but also on the constitution of the macromolecule as well. The relation of specific viscosity to temperature and concentration in very dilute solutions indicates that the dissolved particles are not rigid rod-like particles as is supposed by Staudinger. (S)

X-RAY DIFFRACTION ANALYSIS: INDUSTRIAL APPLICATION OF. V. Hicks. *Instruments*, May 1936, P. 133–6; abs. in *Eastman Kodak Abs. Bull.*, Jan. 1937.

Diffraction analysis is based on the conception that solid bodies are regular in their atomic structure, i.e., the atoms lie in uniformly spaced parallel planes. X-rays penetrate the solids and are reflected from a large number of these planes. The angle at which they are reflected depends upon the distance between the planes and the wave length of the X-rays. These angles of reflection can be measured by the Debye-Scherrer-Hull method, so that it is possible to learn something of the atomic arrangement of various materials. Applications of this method in metallurgy, in the study of textiles, ceramics, glasses, and industrial-dust problems are given. (S)

Book Reviews

DAS FÄRBEN UND BLEICHEN DER TEXTILFASERN IN APPARATEN. P. Weyrich. Pp. 347, with 153 illustrations. Berlin: Verlag von Julius Springer, 1937. Price, paper, 27 Rm.; cloth, 28.8 Rm. (Reviewed in *J. Soc. Dyers Col.*, April 1937, P. 147.) (C)

STORY OF RAYON. The American Viscose Corp. Third edition, pp. 95, illustrated. The Moore Press, Inc., 461 Eighth Ave., New York, N. Y., price 50c.

Notable addition to the third edition of this interesting and instructive volume is a chapter devoted to spun rayon, another on the Crown Quality Control Plan, and a chapter on the adaptability and care of rayon fabrics, the latter contributed by the Better Fabrics Testing Bureau of the National Retail Dry Goods Association. (C)